Psychological resilience and its relationship with physical self-esteem among mixed martial arts practitioners- A field study of selected clubs in the eastern Algeria

الصلابة النفسية وعلاقتها بتقدير الذات البدنية لدى ممارسي الرياضات القتالية المختلطة- دراسة ميدانية على بعض أندية الشرق الجزائري

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- **Abstract:** This study aims to examine the relationship between psychological hardiness and physical self-esteem among mixed martial arts (MMA) practitioners in Algeria, as well as to analyse the correlations between the three dimensions of psychological hardiness (commitment, challenge and control) and physical self-esteem.

A descriptive-correlation approach was adopted. The sample consisted of 30 mixed martial arts athletes selected from three clubs in eastern Algeria. Data were collected using the psychological hardiness Scale (Makhmar, 2002) and the Physical Self-Esteem Scale developed by Mohamed Allaoui, Issam al-hilali and Taymour Ahmed Ragheb. Statistical analyses were performed using SPSS 22, and Pearson's correlation coefficient was applied to test the research hypotheses.

The results revealed a statistically significant inverse correlation between commitment and physical self-esteem ($r = -0.631$, $p < 0.001$), a statistically significant positive correlation between challenge and physical self-esteem ($r = 0.537$, $p = 0.003$), and a non-statistically significant relationship between control and physical self-esteem ($r = -0.359$, $p = 0.069$).

Overall, the results suggest that psychological hardiness is not a uni-dimensional construct in its relationship with physical self-esteem. Rather, its effects vary across its dimensions. The challenge dimension appears to enhance physical self-esteem, whilst commitment shows a contradictory inverse association in this context.

- **Keywords:** psychological hardiness, commitment, challenge, control, physical self-esteem, mixed martial arts

- **الملخص:** تهدف هذه الدراسة إلى دراسة العلاقة بين الصلابة النفسية وتقدير الذات البدنية لدى ممارسي الفنون القتالية المختلطة (MMA) في الجزائر فضلاً عن تحليل الارتباطات بين الأبعاد الثلاثة لصلابة النفسية (الالتزام، التحدي والتحكم) وتقدير الذات البدنية.

تم اعتماد المنهج وصفي-ارتباطي. العينة مكونة من 30 رياضيًا يمارسون رياضة الفنون القتالية المختلطة تم اختيارهم من ثلاثة أندية من شرق الجزائر. تم جمع البيانات باستخدام مقياس

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الصلابة النفسية (مخيمر، 2002) ومقياس تقدير الذات البدنية الذي أعده محمد علاوى وعصام الهلالي وتيمور أحمد راغب. تم إجراء التحليلات الإحصائية باستخدام برنامج SPSS 22، وتم تطبيق معامل ارتباط بيرسون لاختبار فرضيات البحث.

كشفت النتائج عن ارتباط عكسي ذي دلالة إحصائية بين الالتزام وتقدير الذات الجسدي (r = -0.631، p < 0.001)، وارتباط إيجابي ذي دلالة إحصائية بين التحدي وتقدير الذات الجسدي (r = 0.537، p = 0.003)، وعلاقة غير دالة إحصائيا بين التحكم وتقدير الذات البدنية (r = -0.359، p = 0.069).

بشكل عام، تشير النتائج إلى أن الصلابة النفسية ليست مكونًا أحادي البعد في علاقتها بالتقدير الذات البدني. بل إن آثارها تختلف باختلاف أبعادها. يبدو أن بُعد التحدي يعزز تقدير الذاتي البدني، في حين يُظهر الالتزام ارتباطًا عكسيا متناقضًا في هذا السياق.

- **الكلمات المفتاحية:** الصلابة النفسية، الالتزام، التحدي، التحكم، تقدير الذات البدنية، الفنون القتالية المختلطة.

- Introduction:

Sports psychology now plays a vital role in understanding the factors that determine athletic performance. Beyond the physical and technical aspects, psychological factors have a significant influence on athletes' ability to adapt to the demands of training and competition, particularly in combat sports such as mixed martial arts (MMA).

MMA constitutes a particularly demanding environment, characterised by high uncertainty, direct confrontation and intense physical and mental pressure. In this context, performance depends not only on physical abilities, but also on the psychological resources mobilised by the athlete to cope with competitive stress (fletcher & sarkar, 2012)

Among these resources, psychological hardiness, often conceptualised through the hardiness model, plays a central role. According to (Kobasa, 1979) , this concept is based on three fundamental dimensions: engagement, control and challenge. (Maddi, 2002) Subsequently clarified that these dimensions enable the individual to make sense of stressful events, maintain a sense of control, and perceive difficulties as opportunities for growth.

Furthermore, physical self-esteem constitutes a specific dimension of the overall self, corresponding to an individual's perception of their physical abilities and physical

efficacy. According to (Fox, 1997) , this dimension plays a central role in motivation, self-confidence and persistence in sporting activity. (Marsh, 1990) also emphasises that physical self-esteem is strongly linked to the perception of competence in motor activities.

However, despite the importance of these two constructs, research examining their relationship in combat sports remains limited, particularly in African contexts and specifically in Algeria. This study therefore aims to analyse the relationship between psychological hardiness and physical self-esteem among MMA practitioners, as well as the specific links between its dimensions and physical self-esteem.

General Question:

Is there a statistically significant correlation between psychological hardiness and physical self-esteem among mixed martial arts (MMA) practitioners?

Specific Questions:

1- Is there a statistically significant correlation between commitment and physical self-esteem among mixed martial arts (MMA) practitioners?

2- Is there a statistically significant correlation between challenge and physical self-esteem among mixed martial arts (MMA) practitioners?

3- Is there a statistically significant correlation between control and physical self-esteem among mixed martial arts (MMA) practitioners?

General Hypothesis:

There is a statistically significant correlation between psychological hardiness and physical self-esteem among mixed martial arts practitioners

Specific hypotheses:

1- There is a statistically significant correlation between commitment and physical self-esteem among mixed martial arts (MMA) practitioners.

2- There is a statistically significant correlation between challenge and physical self-esteem among mixed martial arts (MMA) practitioners.

3- There is a statistically significant correlation between control and physical self-esteem among mixed martial arts (MMA) practitioners.

Aim: This research is largely exploratory in nature, as it aims to assess the relationship between psychological hardiness and physical self-esteem among competitive athletes practising mixed martial arts (MMA), as well as the extent of the relationship between physical self-esteem and the various dimensions of psychological hardiness, namely: commitment, challenge and control.

Significance of the Study:

Theoretical: To contribute to the scientific literature in sports psychology and expand knowledge regarding the psychological factors influencing athletic performance.

Practically: To provide scientific evidence for coaches and sports psychologists to develop training programmes aimed at enhancing psychological hardiness and physical self-esteem among athletes.

Similar Studies:

1-Gueracha Tayeb: Studying the relationships between physical self-esteem and some physical characteristics of football players.

This study aims to determine the relationship between levels of physical self-esteem and certain physical characteristics among footballers. The researcher hypothesised that there is a statistically significant relationship between levels of physical self-esteem and certain physical characteristics, namely endurance, speed, flexibility and agility, among footballers. The researcher used a descriptive approach based on correlation analyses on a sample of 25 players. He also employed physical tests and a physical self-esteem scale. The results showed that the level of physical self-esteem in the research sample was close to 'good'. The results also indicated the existence of a statistically significant positive relationship between self-esteem and certain physical characteristics studied in footballers (Gueracha, 2022).

2- Tanech mohamed: psychological hardiness and its relationship with self-esteem among professional association football players – Afield study on some first-class professional club senior's category:

This study aimed to determine the relationship between psychological hardiness, in its three dimensions (commitment, mastery and challenge), and self-esteem among footballers playing in the top professional division, as well as to assess the level of psychological hardiness and self-esteem among these players. The researcher employed a descriptive approach and a correlational study. The study population consisted of players from professional first-division clubs in the senior category. The sample comprised 86 players from selected clubs. To collect the data, the researcher used two scales: the psychological hardiness scale and the self-esteem scale. The study concluded that there is a statistically significant relationship between psychological hardiness, with its dimensions (commitment, mastery, challenge), and self-esteem among footballers in professional first-division clubs. It was also demonstrated that the level of psychological hardiness was average among the footballers, whilst the level of self-esteem was high among players from first-division professional league clubs (Tanech, 2023-2024).

3- Saidi zerouki djamal, Kissari ali, Mahi sofiane, Saidi zerouki youcef : Physical self-concept among Karate-do practitioners.

This study aims to shed light on body image among karate practitioners, in order to reveal certain little-known aspects of martial arts and to highlight their characteristics and benefits with a view to encouraging their practice. The researcher employed a descriptive approach on a sample comprising 34 karate-do practitioners, holding black belts from 1st DAN to 5th DAN, spread across three wilayas: Chlef, Aïn Defla and Tipaza. The sample was selected using a purposive sampling method. The results were analysed and revealed the existence of statistically significant differences between body image and belt grade or technical level (Saidi zerouki, Kissari, Mahi, & Saidi zerouki, 2024) .

Definitions of concepts:

Psychological hardiness:

Funk (1992) defines it as "a general personality trait that works in order to form and develop the various "enhanced" environmental experiences surrounding the individual since childhood" (Funk, 1992).

Brooks defines it as "the individual's ability to effectively deal with psychological stress. The ability to adapt to daily challenges and difficulties and deal with frustration, mistakes, and psychological trauma and everyday problems" (Brooks, 2003).

Operational definition of psychological hardiness:

The researcher defines it as the extent to which a mixed martial arts practitioner scores on the psychological hardiness scale, which comprises several dimensions, namely commitment, control and challenge, enabling the athlete to achieve a high score on the psychological hardiness scale. This explains why the athlete possesses greater psychological hardness and the ability to withstand psychological pressure, a greater willingness to face challenges, and a greater commitment to themselves and their teammates.

Physical self-esteem:

Physical self-esteem refers to an individual's assessment of themselves in terms of physical abilities and body image; it reflects their level of satisfaction with their physical performance and appearance (Guérin, 2003).

Operational definition:

The researcher concludes that the physical self refers to the athlete's belief in and appreciation of their acquired physical characteristics; in other words, they are aware of and confident in the physical and technical qualities they possess, which help them to cope with various situations and positions in sporting competitions.

Mixed martial arts:

This is a comprehensive combat sport that combines techniques from various martial arts such as boxing, wrestling, judo, jiu-jitsu and Muay Thai, and which allows fighters to use strikes (punches and kicks), grappling and ground fighting techniques in a competitive setting, with the aim of producing a fighter capable of handling any combat situation. The aim is to train a well-rounded fighter, combining standing and ground fighting techniques.

The preliminary study:

We conducted this exploratory field study by first visiting a number of MMA clubs, where we interviewed coaches to assess the feasibility of a field study on our research topic, and by distributing questionnaires to members of the sample. We distributed 35 forms containing the questionnaires, of which 30 were returned to us. We excluded 5 forms as they contained no answers. Our research sample was therefore limited to 30 athletes practising mixed martial arts. The objective of this exploratory study was as follows:

- To verify the location where the research is taking place.
- To verify that the research tool is suitable.
- To obtain authorisation from club officials to conduct this field study

The approach:

We are using a descriptive and analytical approach as it is the most appropriate, given that it is used to study correlation relationships: 'This type of study makes it possible, on the one hand, to assess the relationship between one or more variables and, on the other hand, to determine the strength of that relationship. Correlation studies are useful for making predictions, but the relationship between variables does not necessarily imply a cause-and-effect link.

The sample:

The research sample was selected from the athletes participating in the national mixed martial arts competition held in July 2025 in the city of Constantine. The

number of participants is estimated at 30 athletes belonging to 3 martial arts teams from eastern Algeria, and it is a purposive sample, broken down as follows:

10 athletes from the Oussoud cirta Constantine club

10 athletes from the Al-Raed Ain El-Beyda club, Oum El-Bouaghi province

10 athletes from the Souk Ahras club

Sample characteristics: The entire sample is male and trains throughout the week, averaging 5 to 6 sessions weekly.

Table No. (01): Distribution of the research sample members by age variable

Age	Frequency	Percentage %
16-23	11	36,66
24-31	13	43,33
2032 and above	06	20
Total	30	**100**

It is clear from Table No. (01) that the research sample varied among different age groups, with the majority being between 24 and 31 years old, numbering 13 athletes, which is estimated at 43.33%.

Table No. (02): Distribution of the research sample members according to the experience variable

experience	Frequency	Percentage %
2- 10	22	73,33
11- 20	08	26,66
Total	**30**	**100**

It is clear from Table No. (02) that the research sample is distributed according to the experience variable, where the vast majority had experience ranging from two to ten years, and their number was 22 athletes, accounting for 73.33%.

Table No. (03): Distribution of the research sample members according to the variable of sports achievement

sports achievement	Frequency	Percentage %
National champion	25	83,33
International and professional champion	05	16,66

Total	30	100

It is clear from Table No. (03) That the research sample is distributed according to the variable of sports achievement, where the vast majority had the level of national champion, with their number being 25 athletes, accounting for 83.33%.

Variables:

Independent variable: psychological hardiness

Dependent variable: physical self-esteem

Scope of the Study:

Time frame: This study was conducted from July 2025 to November 2025.

Geographical scope: We conducted our survey at three mixed martial arts (MMA) clubs in eastern Algeria.

Research tools:

Psychological hardiness Test:

This scale was developed by Imad Mohamed Ahmed Mekhimer (2002). It provides a quantitative assessment of an individual's psychological hardiness. The scale consists of 47 items focusing on aspects of an individual's psychological hardiness. Some items are phrased positively, others negatively; these reverse-scored items therefore refer to the negative aspect of psychological hardiness, and these negative items correspond to the following numbers on the scale (7, 11, 16, 21, 23, 25, 28, 32, 35, 36, 37, 38, 42, 46, 47) As for the positive items, they correspond to the following numbers on the scale: (1, 2, 3, 4, 5, 6, 8, 9, 10, 12, 13, 14, 15, 17, 18, 19, 20, 22, 24, 26, 27, 29, 30, 31, 33, 34, 39, 40, 41, 43, 44, 45).

The psychological hardiness test comprises three dimensions:

Commitment: is the individual's ability to set achievable beneficial goals that satisfy them and their community in addition to dealing with stressful events in a positive and effective manner, this dimension consists of 16 items (1, 4, 7, 10, 13, 16, 19, 22, 25, 28, 31, 34, 37, 40, 43, 46).

Control: as the individual's belief that they can have control over the events they encounter and bear personal responsibility for what happens to them. It includes control, ability to make decisions, withstand events, to effectively face pressures" 12, this dimension consists of 15 items (2, 5, 8, 11, 14, 17, 20, 23, 26, 29, 32, 35, 38, 41, 44).

Challenge: Cobaza and Busetti (1983) define it as "the individual's belief that a renewed change in the events of life is a natural, inevitable, matter for their advancement rather than a threat to their security, self-confidence and psychological well-being, this dimension consists of 16 items (3, 6, 9, 12, 15, 18, 21, 24, 27, 30, 33, 36, 39, 42, 45, 47).

Scoring method for the psychological hardiness Scale

Responses to the Psychological Hardiness Scale are based on three options: (Always- Sometimes - Never), and the score assigned to each statement ranges from three to one point, meaning that responses are scored according to the following scale: (3, 2, 1). conversely, for negative statements, responses are scored according to the reverse scale (1, 2, 3). Consequently, the total score for the scale ranges from 47 to 141 points, with a high score indicating a greater perception of psychological hardiness in the respondent and a lower tendency to adopt a fixed response pattern.

Psychometric characteristics:

Validity and reliability of the Psychological Hardiness Scale:

The reliability of this questionnaire was calculated using internal consistency, based on Cronbach's alpha formula, which involves calculating the correlation coefficient between the items of the scale as a whole. This coefficient stands at 0.753, leading to the conclusion that the reliability of this scale is acceptable, as shown in the following table

Table (4) shows the Cronbach's alpha reliability coefficient for the psychological hardiness scale

Cronbach's alpha	Number of items
0,753	47

Physical Self-Esteem Test :

This scale was developed by Mohammed Allaoui, Issam Elhillali and Taimour Ahmed Ragheb. Its aim is to determine the extent to which athletes assess their physical abilities, taking into account their perception of their strengths and weaknesses in terms of physical fitness within the context of their specific sport. The scale consists of 26 items focusing on:

4 items for each of the following qualities: agility, strength, speed and power

3 items for each of the following qualities: strength endurance and endurance

2 items for each of the following qualities: flexibility, reaction speed and balance

1 item for each of the qualities: maximum strength and speed of movement

The scale comprises 15 positive items, corresponding to the following numbers on the scale (1, 5, 6, 8, 10, 11, 13, 14, 16, 17, 19, 21, 22, 25, 26). As for the negative items, they correspond to the following numbers on the scale (2, 3, 4, 7, 9, 12, 15, 18, 20, 23, 24).

Method for scoring the physical self-esteem scale:

Responses to the physical self-esteem scale are based on five options: (Always – Often – Sometimes – Rarely – Never), and the score assigned to each statement ranges from five to one point, meaning that responses are scored according to the following scale: (5, 4, 3, 2, 1). In order, and in the case of negative statements, responses are scored according to the reverse scale (1, 2, 3, 4, 5). Consequently, the total score for the scale is 130 points, with a high score indicating a heightened positive perception and esteem for one's physical self.

Psychometric characteristics:

Validity and reliability of the Physical Self-Esteem Scale:

The Physical Self-Esteem Scale recorded a high Cronbach's alpha coefficient of 0.916 for the 26 items, which is a very high value reflecting excellent internal consistency, indicating the scale's robustness and high reliability in measuring physical self-esteem among mixed martial arts practitioners.

Table (5) shows the Cronbach's alpha reliability coefficient for the physical self-esteem scale

Cronbach's alpha	Number of items
0,916	26

Statistical analysis: The mean Standard, deviation Cronbach's alpha, Pearson's correlation, the statistical analysis was carried out using SPSS 22 (Statistical Package for the Social Sciences), which was used to calculate Pearson's correlation coefficient in order to test the study's hypotheses.

Presentation and discussion of the results:

1. First partial hypothesis: There is a statistically significant correlation between commitment and physical self-esteem among mixed martial arts (MMA) practitioners.

Table (6) Pearson correlation coefficient between commitment and physical self-esteem

Variable	correlation coefficient	significance level
commitment	-0.631	0.001
physical self-esteem		

**. Correlation is significant at the 0,001 level

From the data in Table (6), it appears that there is an inverse correlation between the dimension of commitment and physical self-esteem as perceived by the members of the sample of 30 athletes, where the correlation coefficient between the two variables is r = -0.631 and the significance level (SIG) was 0.001, which is statistically significant at this level of significance.

This finding appears to contradict some research, which generally links commitment to positive adaptive effects in sport. However, several recent studies suggest that high commitment may be associated with forms of maladaptive perfectionism, leading to critical self-evaluation and personal dissatisfaction (Hill, Mallinson-Howard, & Jowett, 2018)

In the context of MMA, this relationship can be explained by intense competitive pressure and frequent exposure to failure. Highly committed athletes may thus develop high performance standards, which increase the perceived gap between

actual performance and personal expectations, negatively affecting their physical self-esteem.

Conclusion:

The hypothesis is supported in terms of the existence of a functional relationship, but the direction of the relationship is inverse, reflecting the complex nature of commitment in mixed martial arts: whilst it is essential for high performance, it may reduce physical self-satisfaction.

2. Second sub-hypothesis: **There is a statistically significant correlation between challenge and physical self-esteem among mixed martial arts (MMA) practitioners.**

Table (7) Pearson correlation coefficient between challenge and physical self-esteem

Variable	correlation coefficient	significance level
Challenge	0.537	0.003
physical self-esteem		

Correlation is significant at the 0,003 level

From the data in Table (7), it appears that there is a correlation between the level of challenge and physical self-esteem as perceived by the 30 athletes in the sample. The correlation coefficient between the two variables is r = 0.537 and the significance level for SIG was 0.003, which is statistically significant at this level of significance.

This finding is consistent with (Kobasa, 1979) model, according to which perceiving stressful events as opportunities for growth promote psychological adaptation. (Maddi, 2002) also highlights that individuals with a strong challenge orientation develop a greater capacity to adapt to difficult situations.

In the field of sport, (fletcher & sarkar, 2012) demonstrated that psychological hardiness athletes interpret stressful situations in a positive light, which boosts their confidence and their perception of competence. Consequently, challenge-oriented MMA practitioners develop a greater sense of their physical capabilities.

Conclusion:

The hypothesis is supported in terms of the existence of a functional relationship; however, the direction of the relationship is direct, suggesting that the constant challenge in combat sports may act as a stressor that reduces physical self-esteem, despite the psychological benefits and high performance.

3. Third sub-hypothesis: There is a statistically significant correlation between control and physical self-esteem among mixed martial arts (MMA) practitioners.

Table (8) Pearson correlation coefficient between control and physical self-esteem

Variable	correlation coefficient	significance level
Control	-0.359	0.069
physical self-esteem		

Correlation is significant at the 0,01 level

From the table (8), it appears that there is no correlation between the control dimension and physical self-esteem as perceived by the members of the sample of 30 athletes, where the correlation coefficient between the two variables was r = -0.359 and the significance level (SIG) was 0.069, which is not statistically significant at the significance level.

According to (Bandura, 1997), a sense of self-efficacy influences motivation and behaviour, but its impact on self-esteem depends heavily on the context in which it is applied. In combat sports, where many external factors are beyond the athlete's control, this factor may have a limited influence on body image.

Thus, perceived control appears to play a more behavioural than cognitive role in the assessment of physical abilities.

Conclusion:

The hypothesis is rejected, suggesting that self-control, as a factor of psychological resilience, has a limited or indirect effect on physical self-esteem in high-risk, competitive sporting contexts.

General hypothesis: There is a statistically significant correlation between psychological hardiness and physical self-esteem among mixed martial arts practitioners

Table (9) Pearson correlation coefficient between psychological hardiness and physical self-esteem

Variable	correlation coefficient	significance level
Psychological hardiness	-0.598	0.002
physical self-esteem		

**Correlation is significant at the 0,001 level

From reading Table No. (9), it is clear that there is an inverse relationship between psychological hardiness and physical self-esteem as perceived by the sample members, which consists of 30 athletes. The correlation coefficient between the two variables was r = -0.598, and the significance level (SIG) was 0.002, which is statistically significant at the 0.001 level.

The results of the correlation analysis showed that certain dimensions of psychological hardiness- commitment and challenge- are statistically significantly correlated with physical self-esteem, whilst no significant relationship emerged after controlling for other variables.

Consequently, the general hypothesis is partially supported, as the results confirm the existence of a relationship between psychological hardiness and physical self-esteem, but this does not apply to all dimensions.

CONCLUSION:

The aim of this study was to examine the relationship between psychological hardiness and physical self-esteem among MMA practitioners in Algeria.

The results show that this relationship depends heavily on the dimensions considered. The challenge dimension is positively associated with physical self-esteem, whilst commitment shows a significant negative relationship. The control dimension, however, shows no significant relationship.

These results highlight the complexity of the interactions between psychological factors in combat sports and underscore the importance of considering psychological hardiness in a multidimensional manner.

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